PLANET
Networking & Communication

Powerline Communication

Powerline to Ethernet Bridge with 4-port Switch

PL-401E

USER'S MANUAL

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Revision

User's Manual for Powerline Communication product

Model: PL-401E

Rev: 1.0 (Jun. 2003)

Part No. 2080-000004-001

Table of Content

Chapter 1   Introduction

Powerline communication is revolution in home and small office networking, greatly simplifying the task of installing a high-speed local area network. With PLANET's powerline communication products, you can utilize existing AC power outlets and wires to connect your computers, servers and other devices safely, securely and at true LAN speeds of up to 14 Mega bits per second. No complex and expensive specialized wiring usually associated with LAN's is required, or management, security and interference problems associated with 802.11x wireless technologies – just convenient, reliable, secure and simple networking where you need it most. PLANET's Powerline products allow you to place a computer anywhere in your home or small office with flawless, uninterrupted high-speed network connection.

Security of PLANET's Powerline communication technology is assured by the use of 56-bit DES encryption – the same system used to protect banking systems all over the world, and is interference free, avoiding the problems of wireless systems.

1.1 Powerline to Ethernet Bridge with 4-port Switch – PL-401E

PL-401 is a Powerline to Ethernet bridge with four 10base-T/100Base-TX RJ-45 Ethernet interface for directly connecting to computer's Ethernet card or existing Ethernet switch, hub or broadband router, gives a high flexibility to expand your powerline or Ethernet network. Enhanced by new Intellon chipset, PL-401 provides the convenience of communication between different electrical phases. You do not need to worry about the wire system of your house or office anymore. Also, a power socket for connecting to wall outlet is offered in its standard package.

1.1.1 Features

♦ Four 10/100Mbps Auto-negotiation and Auto-MDI/MDIX switching ports for flexibility network connectivity
♦ Internal power supply with one power line networking interface
♦ Complies with HomePlug Powerline Alliance Specification 1.0
♦ Up to 14Mbps bandwidth on powerline interface
♦ Support CSMA/CA protocol on powerline interface

♦ 56-bit data encryption to ensure data security and reliability

♦ Easy to use Windows-based security key configuration utility

♦ Significant LED indicators

♦ Up to 90 meters between two powerline nodes

♦ Able to communicate between different electrical phases

1.1.2 Package Contents

Check the contents of your package for following parts:

■ One Powerline to Ethernet Bridge

■ One Power Cord

■ One Manual and Utility CD-ROM

■ One Quick Installation Guide

If any of these pieces are missing or damaged, please contact your dealer immediately, if possible, retain the carton including the original packing material, and use them against to repack the product in case there is a need to return it to us for repair.

1.1.3 Hardware Description

PL-401E front panel
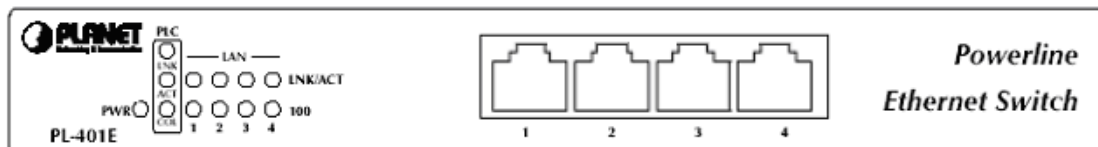
LED definition

LED		Color	Description
PWR		Green	Steady on indicates PL-401E is powered on.
PLC	LNK	Green	Steady on indicates PL-401E has detected other Powerline devices in range.
	ACT	Green	Blinking indicates there existing powerline network traffic.
	COL	Orange	Blinking indicates there existing collision in powerline network.
LAN	LNK/ACT	Green	Steady on indicates the Ethernet link of the port is up. Blinking indicates there is network traffic through the port.
	100	Orange	Steady on indicates the link speed of the port is 100Mbps.

PL-401E rear panel

100 ~ 240 VAC

50/60 Hz

One 2-pin power inlet for both powerline network and power supply

1.1.4 Specification

Model	PL-401E
Standards	HomePlug 1.0 IEEE 802.3 10Base-T IEEE 802.3u 100Base-TX
Ports	One Powerline Port Four 10/100M Ethernet RJ-45 ports
Cabling Type	Powerline: Power Cord LAN: UTP Cat 3 or better
Speed	Powerline: 14Mbps (actual throughput is about 6Mbps) LAN: 10/100Mbps
Powerline Frequency Band	4.3MHz to 20.9MHz
Encryption	56-bit DES with Key configuration software
LEDs	PWR, PLC: LNK, ACT, COL, LAN: LNK/ACT, 100
Dimension	197 x 120 x 35 mm
Certifications	FCC Class B, CE
Operating Temp.	0 ~ 50 degree C
Storage Temp.	-20 ~ 70 degree C
Operating Humidity	10~90% non-condensing
Storage Humidity	5~95% non-condensing
Utility compatibility	Windows 98, 2000, Me and XP

Chapter 2　Planning your Powerline Network

With PLANET PowerLine products, a network can be created using home powerlines. Computers can be networked over powerlines using a USB Adapter or an Ethernet converter. Use PL-102U for a USB-enabled computer or use PL-401E for an Ethernet-enabled computer. The PL-401E is also ideal for any user who already has a router and wants to share high-speed Internet access across the powerline network. Connect PL-401E to the router after you have configured it using the Security Configuration Utility. Connect a straight-through UTP Category 5 cable to the uplink port of the router, or connect crossover UTP Category 5 cable to a LAN port on the router.
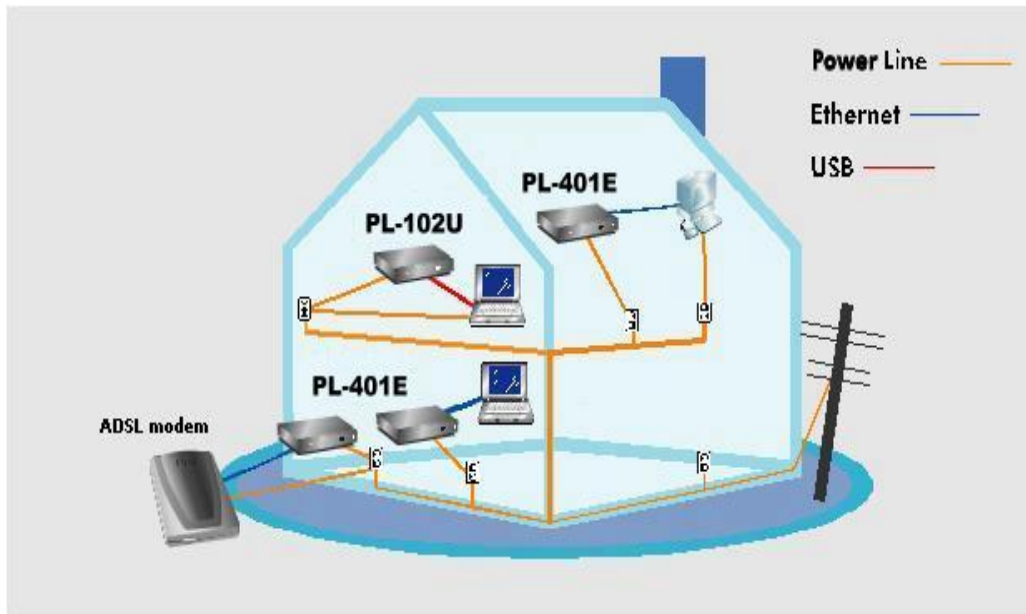
Chapter 3   Powerline to Ethernet Bridge Installation

Please follow the procedures below to install your PL-401E:

1. Plug one end of an UTP category 5 cable into the computer, switch or hub's LAN port.

2. Plug the other end of the network cable into one of the 10/100 RJ45 Ethernet ports on PL-401E.

3. Plug the power cord into the powerline port on PL-401E.

4. Plug the other end of the power cord into a power outlet.

Note1: Use only the supplied power cord to connect PL-401E to the power outlet.

Note2: Because PL-401E sends data over the powerline of your house, it is best to plug its power cord directly into a power outlet. Do not plug PL-401E into a UPS power strip with surge protection. PL-401E has its own power filter for protection against surges.

Chapter 4   Encrypting Your Powerline Network

4.1 PowerPacket Configuration Utility Installation

1. Insert the CD-ROM into the CD-ROM drive to initiate the autorun program. Once completed,
   a menu screen will appear as follows:
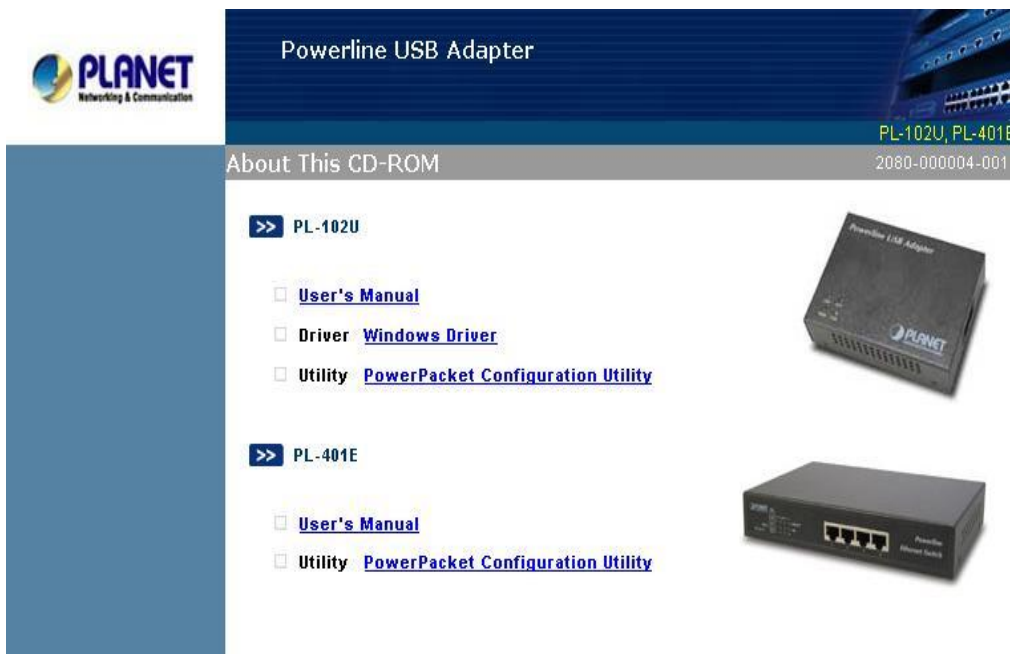
2. To install the utility, click on the **"PowerPacket Configuration Utility"** hyperlink in PL-401E
   field to activate the installation procedure for the application program.

   If the above screen is not shown, you can start the installation as follows.
   • Click on **Start Menu/ Run.**
   • Enter "E:\Utility\PL-401E\setup.exe" in the appeared box, where "E" is the letter of your
     CD-ROM drive.
   • Click on "OK" button.

3. On the *Welcome* screen, click the **Next** button.

4. When the *License Agreement* screen is displayed, read the License Agreement, then click the radio button to the left of "**I accept the terms in the license agreement**" and click the **Next** button.
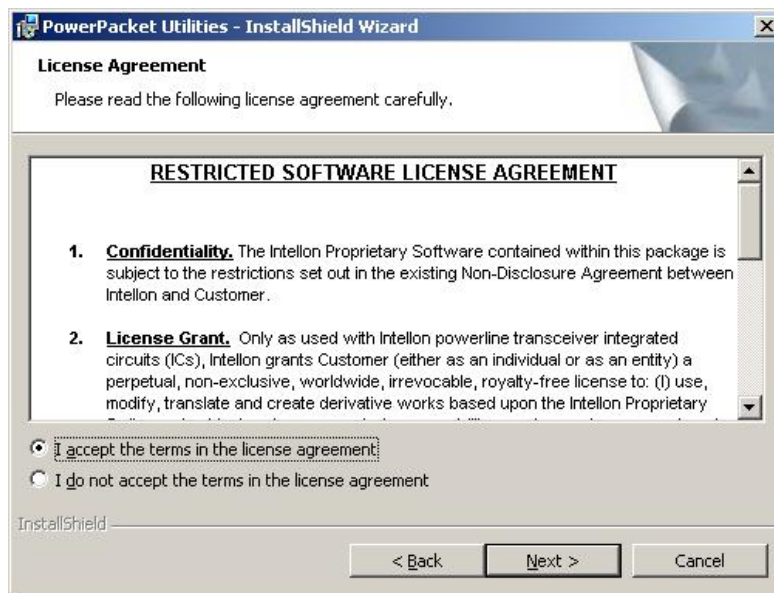

5. On the *Customer Information* screen, enter the required information and select whom this application is installed for. Then click the **Next** button.

6. The InstallShield Wizard shows your current settings in next screen. If you need to review or change any settings, click the **Back** button. Click the **Cancel** button to exit the Wizard. Otherwise, click the **Install** button.
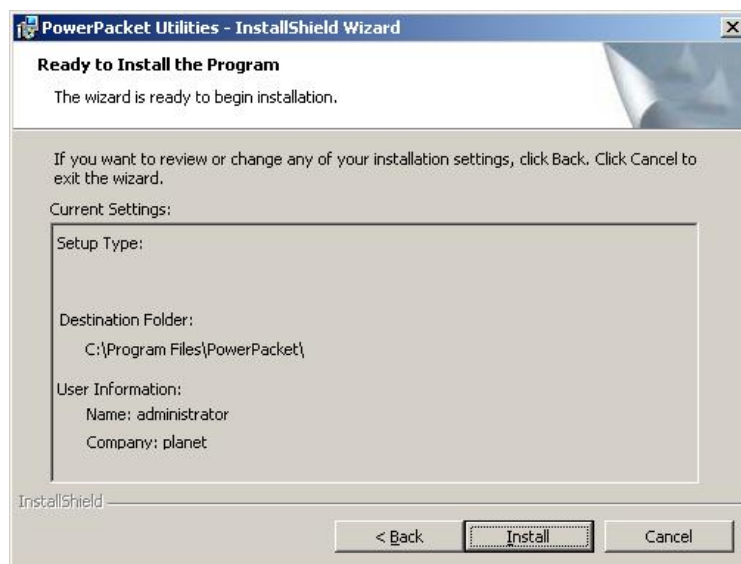
7. The InstallShield Wizard would ask you to plug your PL-401E to PC to complete the installation. After ensuring PL-401E is well connected, click the **OK** button
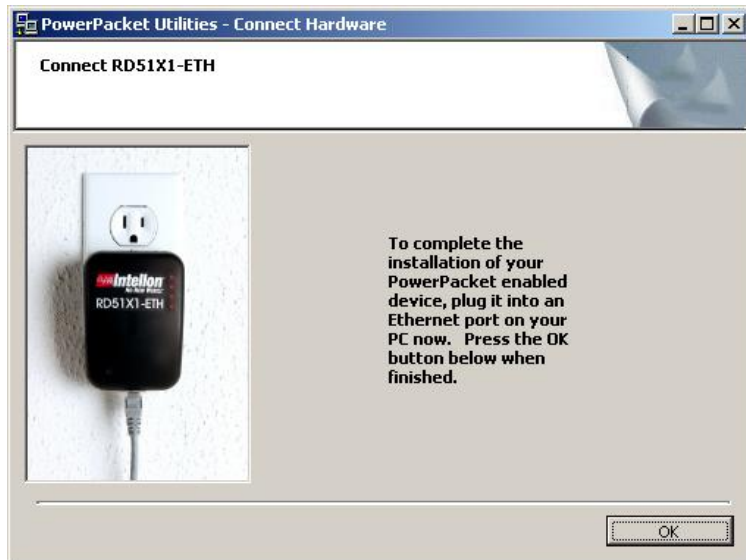
8. When finished, click **Finish** to end the Installation Wizard.
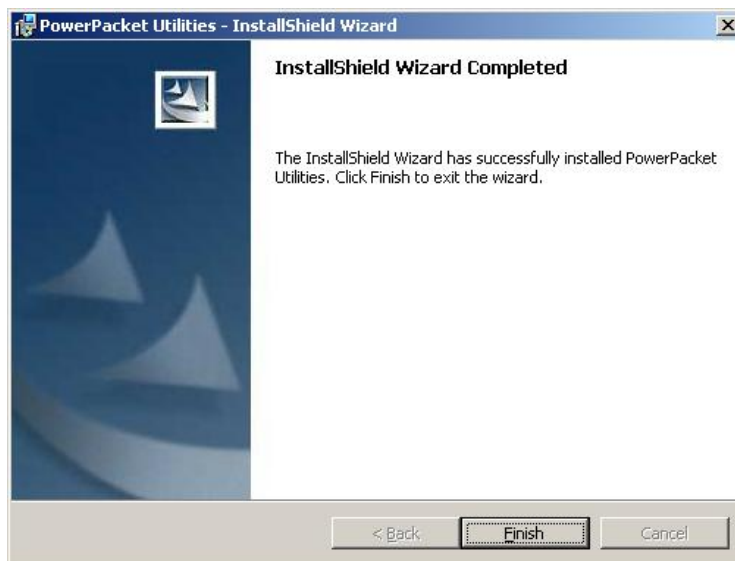
9. Remember to restart your computer to have the new configuration take effect.
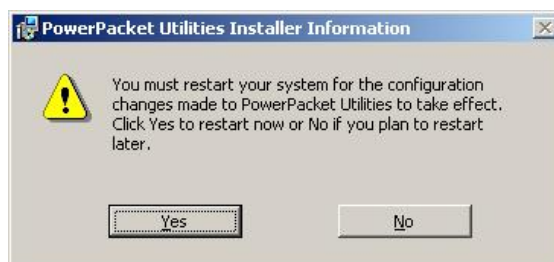
4.2 PowerPacket Configuration Utility Usage

After successfully installing the utility, your computer desktop will display this icon, ,
PowerPacket Configuration Utility. Double-click the icon to activate the utility.

> **Note: Make sure your TCP/IP protocol is set up appropriately on your computer before running PowerPacket configuration utility.**

4.2.1 Device Screen

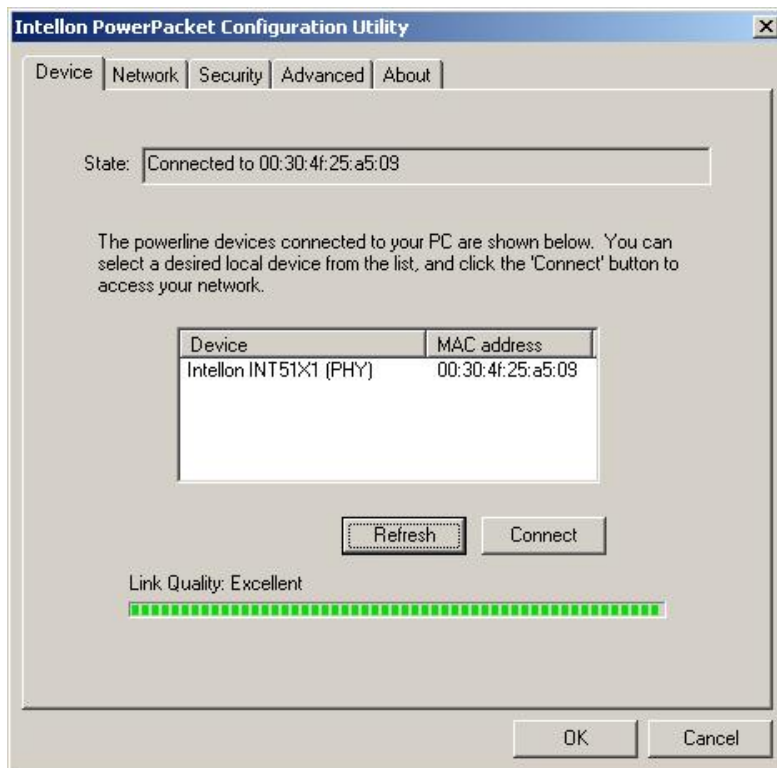When initiating the program, it will analyze your powerline network. Once the analysis is done, the Device screen will be shown as above. In the text list box, it reports all PowerPacket™ devices found that are locally connected to the computer where the utility is running. In most cases, one device only is listed. In case you have more, click on one of them and hit **Connect**. Make sure that the **State** box indicates that your PC is connected to the same device. Now you are ready to manage the powerline network connected to this device, ensure its privacy and measure its data rate performance. Press **Refresh** button to refresh the search of the powerline devices connected to your computer.
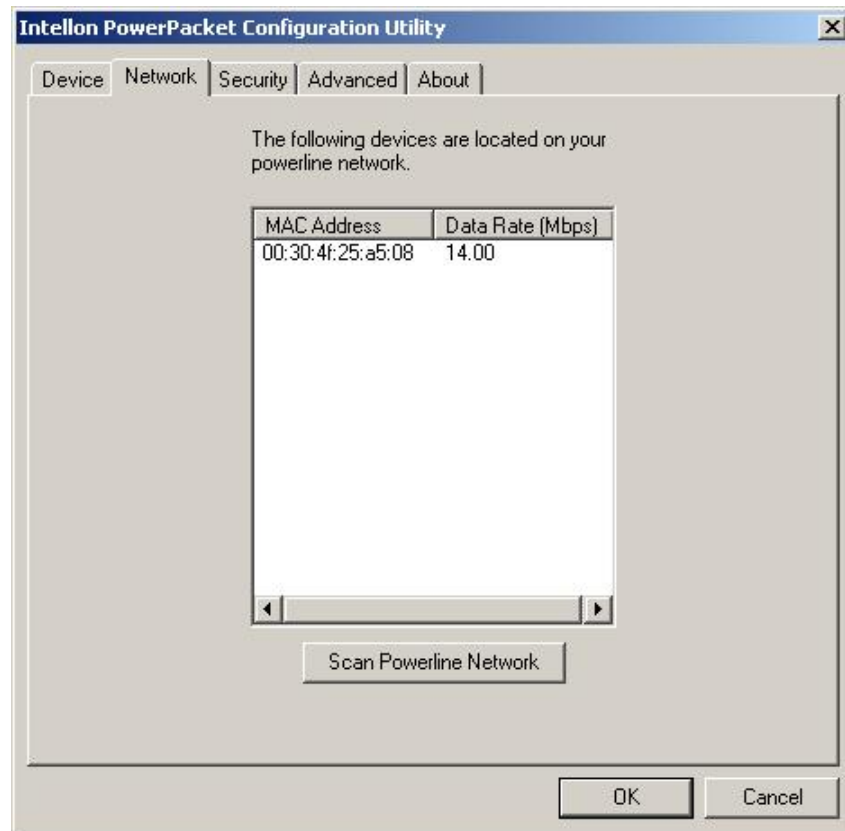
The progress bar will change into a status bar indicating the network average data rate. The color of the bar reflects the average performance of the powerline network :

Green : Excellent performance

Yellow : Fair performance

Red : Poor performance

4.2.2 Network Screen

The **Network** screen provides detailed information about your powerline network. The text list box shows all PowerPacket™ devices found on your powerline network identified by their MAC addresses. The second column indicates their data rate measurements in Mbps. Press **Scan Powerline Network** button to refresh the listed information.

In case a PowerPacket™ device in your network is not listed in the screen above, make sure that its network password has not been made private previously with a different password than your current private network password. You can always reset a PowerPacket™ network password to the universal one by running the PowerPacket™ Configuration Utility on the PC attached to this device and use "HomePlug" as the network password.

4.2.3 Security Screen

All PL-401E are shipped using **"HomePlug"** as a network password. The **Security** screen allows you to change this network password and set your own private password and apply it to PL-401E connected to the computer where the utility is running. Click **Restore Default** button to restore the original network password **"HomePlug"** and apply it locally. Click **Set Local** button to change the network password locally.

> **Note: Your private network password must have between 4 and 24 characters. The password is case sensitive. The password can include any letters of the alphabet, numbers or punctuation marks. Remember this password as it will be needed when adding other devices to the network later.**

4.2.4 Advanced Screen
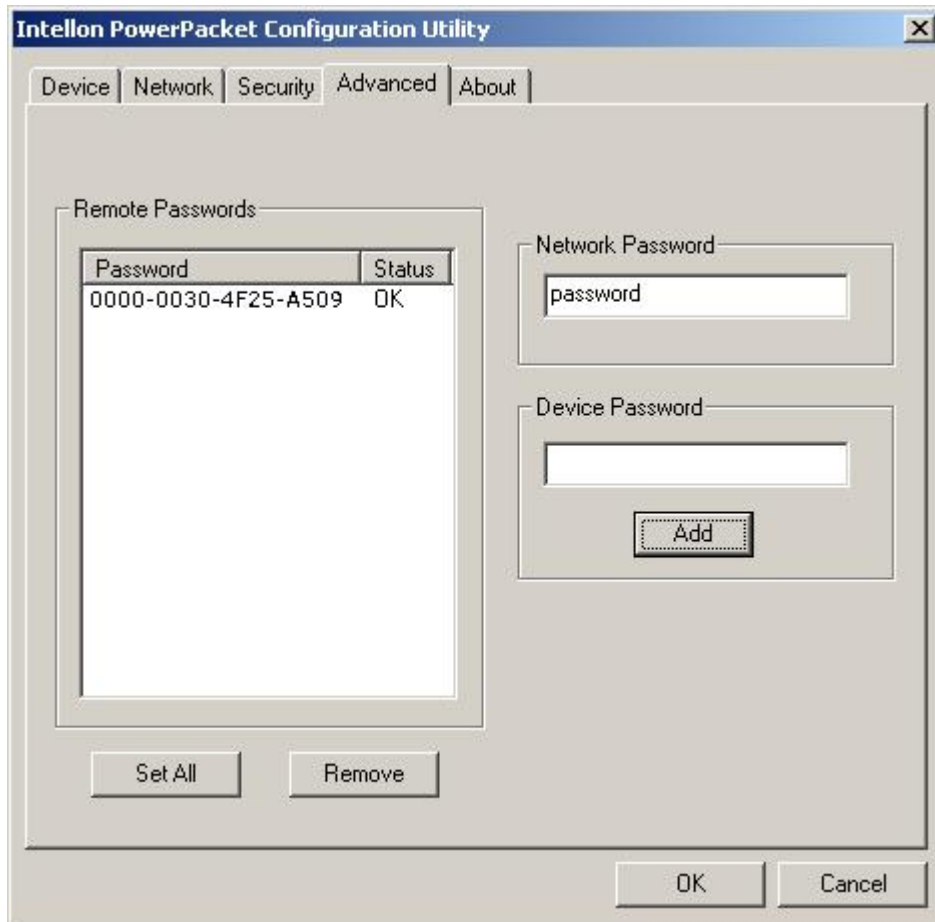
The **Advanced** screen allows you to set up a network password remotely on other PL-401E through the powerline. Type your private network password into the **Network Password** text box. The device password of a PL-401E is adding 0000 to its MAC address. For example, the device password of a PL-401E with MAC 00304F25A509 is 0000-0030-4F25-A509. The other device on the network with PowerPacket™ capabilities will have a different device password printed on either the case itself or in the documentation. Find the passwords for all devices you want to manage and type them one by one into the **Device Password** text box and click **Add**. This will add the passwords to **Remote Passwords** text list box and set them to the currently defined Network Password.

Note: The device must be present on the powerline in order for the password to be confirmed and added to the Remote Passwords list.

The **Status** indicates whether each device is successfully set to the **Network Password.** "**OK**" indicates success while "**Fail**" indicates a failure. Click **Set All** to apply your private network password to all devices that are listed in the **Remote Passwords** text list box and to your local device connected to the computer where the utility is running as well. Select a password and

click **Remove** to remove it from the list.

4.2.5 About Screen
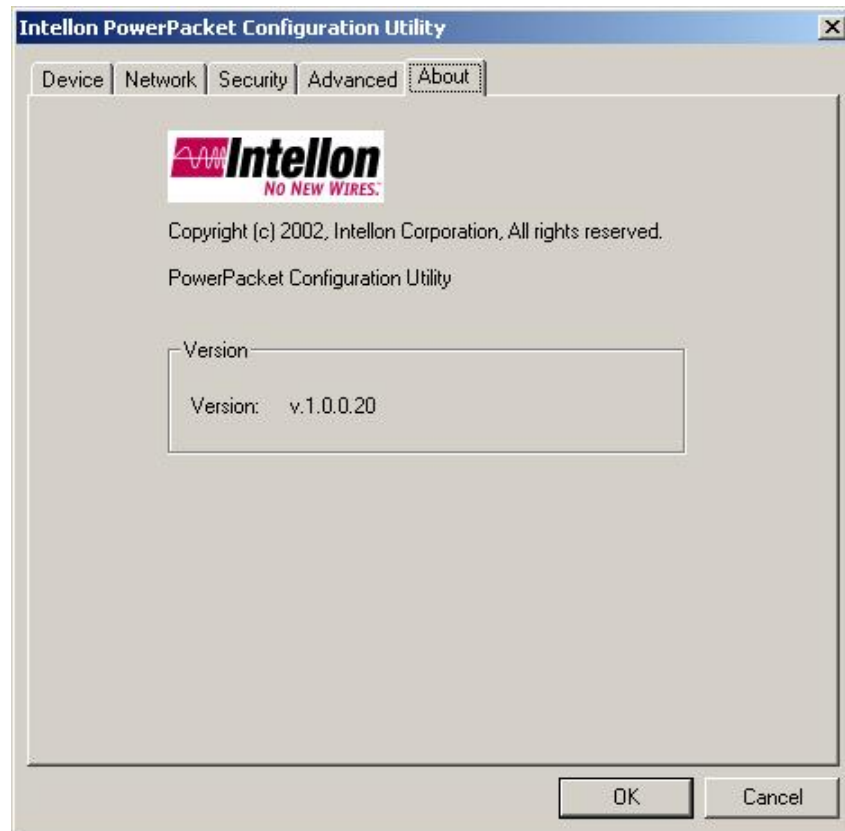
The **About** screen shows the software version.

Chapter 5　Troubleshooting

◆ I can not connect to other computers on my powerline network or to the Internet.

A: Make sure the IP address and TCP/IP protocol are set up correctly for all the powerline networked computers.

◆ Do the PL-401E device cause interference with other home networking or products?

A: No. PL-401E can co-exist with phone line and wireless networking technologies. PL-401E operates in a different frequency band than powerline control and co-exist with technologies such as X-10, CEBus and LONworks.

◆ How do the PL-401E devices handle signal interference between two adjacent homes? How is eavesdropping prevented?

A: PL-401E is using 56-bit DES security encryption to ensure network separation between homes. You can use PowerPacket configuration utility to enable and configure the security encryption on local or remote PL-401E in range.